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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/802,986	03/12/2001	Yukio Michishita	00USFP606	6963

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EXAMINER

TRAN, DZUNG D

ART UNIT	PAPER NUMBER
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2633

DATE MAILED: 07/01/2004

8

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/802,986

Applicant(s)

MICHISHITA, YUKIO

Examiner

Dzung D Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 March 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-3, 6-11 and 14-19 is/are rejected.
- 7) ☐ Claim(s) 4, 5, 12 and 13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 3, 4, 5.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

1. Upon further consideration, the restriction requirement mailed on 12/31/2003 is withdrawn. Therefore, all the claims (1-19) are examined.

Specification

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 6 recites the limitation "third wavelength dispersion compensator" in line 3.

There is insufficient antecedent basis for this limitation in the claim.

Claim 7 recites the limitation "fourth wavelength dispersion compensator" in line

3. There is insufficient antecedent basis for this limitation in the claim.

Claim 12 recites the limitation "third wavelength dispersion compensator" in line

3. There is insufficient antecedent basis for this limitation in the claim.

Claim 13 recites the limitation "fourth wavelength dispersion compensator" in line

3. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otani et al. US patent no. 6,115,156.

Regarding claim 1, Otani discloses a demultiplexer device 19 (col. 3, line 46-47) (same as light branching apparatus), comprising:

an optical coupler (20, 21, 22, col. 3, line 8) (same as splitter) which splits an optical signal for a plurality of channels ($\lambda_1 \dots \lambda_4$) on a first optical fiber (1) into at least a first optical channel signal on a first channel (channel λ_4) of a second optical fiber (fiber that output S1) and a plurality of second optical channel signals on a plurality of second channels (channel $\lambda_1, \lambda_2, \lambda_3$) of a third optical fiber (fiber that output S2, S3, S4); and

a first equalizing fiber 2 (same as wavelength dispersion compensator) which is provided for said first channel (channel λ_4) and compensates wavelength dispersion of said first optical channel signal (channel λ_4) due to the second optical fiber (fiber that output S1) (col. 1, lines 51-54). Although Otani does not specific disclose equalizing fiber 2 compensates wavelength dispersion of said first optical channel signal (channel λ_4) due to the optical splitter. However, Otani discloses that equalizing fiber 2 is fully compensated for optical signal S1 (col. 1, lines 51-54) that is passed thru optical splitter 20. Therefore, if it is not inherent, it would have been obvious to one skill in the art that at the equalizing fiber would compensated wavelength dispersion of said first optical channel signal (channel λ_4) due to the second optical fiber (fiber that output S1) and due to the splitters (20).

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Regarding claim 2, Otani discloses a second wavelength dispersion compensator 23 which is provided for said plurality of second channels (channel λ_1 , λ_2 , λ_3) and compensates wavelength dispersion of said plurality of second optical channel signals (channel λ_1 , λ_2 , λ_3) due to said optical splitter.

Regarding claim 3, Otani further discloses first equalizing fiber 2 (same as wavelength dispersion compensator) which is provided for said first channel (channel λ_4) and compensates wavelength dispersion of said first optical channel signal (channel λ_4) due to the second optical fiber (fiber that output S1).

6. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otani et al. US patent no. 6,115,156 in view of Bergano US patent no. 6,137,604.

Regarding claim 8, as per claim 1 above, Otani discloses all the limitations, except for plurality of optical channel signals are compensated in units of channels, and said first wavelength dispersion compensator includes at least a first wavelength dispersion compensating element for the channel of said first optical channel signal. Abbott discloses a dispersion equalizer 105 of figure 1 that compensating the wavelength dispersion per each channel (i.e. sub-band) see figure 3. At the time of the invention was made, it would have been obvious to a person of ordinary skill in the art to replace the dispersion equalizer that is disclosed by Bergano with the equalizing fiber in the de-multiplexer of Otani. One of ordinary skill in the art would have been motivated to do this since the dispersion equalizer device of Bergano offers advantage for

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compensating wavelength dispersion of each optical channel in the variable span distance.

Regarding claims 6 and 7, as far as examiner understood, Bergano discloses third wavelength dispersion compensator and fourth wavelength dispersion compensator (205₁ to 205_N) which is provided for said first channel and third channel and compensates wavelength dispersion of said first optical channel signal and third optical channel signal due to said second optical fiber.

7. Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otani et al. US patent no. 6,115,156 in view of Prior Art figure 1.

Regarding claim 9, as per claim 1 above, Otani discloses all the limitations, except for a first optical fiber connected to a first station; a second optical fiber connected to a second Station; a third optical fiber connected to a third station. Prior art, in figure 1 discloses a WDM system that include optical brancher 13, having a first optical fiber connected to a first station 11; a second optical fiber connected to a second Station 12; a third optical fiber connected to a third station 14. At the time of the invention was made, it would have been obvious to a person of ordinary skill in the art to connect the terminal stations taught by prior art connected to the de-multiplexer of Otani. One of ordinary skill in the art would have been motivated to do this in order for properly distribute the optical signals to end users.

Regarding claim 10, Otani discloses a second wavelength dispersion compensator 23 which is provided for said plurality of second channels (channel λ_1 , λ_2 ,

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λ_3) and compensates wavelength dispersion of said plurality of second optical channel signals (channel λ_1 , λ_2 , λ_3) due to said optical splitter.

Regarding claim 11, Otani further discloses first equalizing fiber 2 (same as wavelength dispersion compensator) which is provided for said first channel (channel λ_4) and compensates wavelength dispersion of said first optical channel signal (channel λ_4) due to the second optical fiber (fiber that output S1).

8. Claims 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otani et al. US patent no. 6,115,156 in view of Prior Art figure 1 and further in view of Bergano US patent no. 6,137,604.

Regarding claim 16, as per claim 9 above, Otani and Prior art figure 1 disclose all the limitations, except for plurality of optical channel signals are compensated in units of channels, and said first wavelength dispersion compensator includes at least a first wavelength dispersion compensating element for the channel of said first optical channel signal. Bergano discloses a dispersion equalizer 105 of figure 1 that compensating the wavelength dispersion per each channel (i.e. sub-band) see figure 3. At the time of the invention was made, it would have been obvious to a person of ordinary skill in the art to include the dispersion equalizer that is disclosed by Bergano in the system of Otani and Morikawa. One of ordinary skill in the art would have been motivated to do this since the dispersion equalizer device of Bergano offers advantage for compensating wavelength dispersion of each optical channel in the variable span distance.

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Regarding claims 14 and 15, as far as examiner understood, Bergano discloses third wavelength dispersion compensator and fourth wavelength dispersion compensator (205₁ to 205_N) which is provided for said first channel and third channel and compensates wavelength dispersion of said first optical channel signal and third optical channel signal due to said second optical fiber (fiber that output S1).

9. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prior Art figure 2 in view of Otani et al. US patent no. 6,115,156.

Regarding claim 17, Prior art figure 2 discloses a light branching apparatus 13 comprising: an optical switch 13A which switches a transmission channel of a first optical channel signal on a first optical fiber from a first channel on a second optical fiber to a second channel on a third optical fiber. Prior art does not disclose a wavelength dispersion compensator which compensates wavelength dispersion of said first optical channel signal due to said second optical fiber by difference in length between said second optical fiber and said third optical fiber. Otani discloses a wavelength dispersion compensator 2 (same as light branching apparatus) which compensates wavelength dispersion of said first optical channel signal (channel λ_4) due to said second optical fiber. At the time of the invention was made, it would have been obvious to a person of ordinary skill in the art to include the wavelength dispersion compensator taught by Otani in the prior art system. One of ordinary skill in the art would have been motivated to do this since the equalizing fiber of Otani offers advantage for compensating wavelength dispersion of each optical channel in the variable span distance.

Regarding claim 18, Otani further discloses an optical coupler (20, 21, 22, col. 3, line 8) (same as splitter) which splits an optical signal for a plurality of channels (λ_1 ... λ_4) on a first optical fiber (1) into at least a first optical channel signal on a first channel (channel λ_4) of a second optical fiber (fiber that output S1) and a plurality of second optical channel signals on a plurality of second channels (channel λ_1 , λ_2 , λ_3) of a third optical fiber (fiber that output S2, S3, S4); and a first equalizing fiber 2 (same as wavelength dispersion compensator) which is provided for said first channel (channel λ_4) and compensates wavelength dispersion of said first optical channel signal (channel λ_4) due to the second optical fiber (fiber that output S1) (col. 1, lines 51-54).

10. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Prior Art figure 2 in view of Otani et al. US patent no. 6,115,156 and further in view of Bergano US patent no. 6,137,604.

As per claims above, prior art and Otani disclose all the limitations except for a second wavelength dispersion compensator which is provided for a second channel of second optical fiber and compensates wavelength dispersion of second optical channel signals due to second optical fiber. Bergano discloses a dispersion equalizer 105 of figure 1 that compensating the wavelength dispersion per each channel (i.e. sub-band) see figure 3 having plurality equalizing fiber for compensating each channel in the optical fiber. At the time of the invention was made, it would have been obvious to a person of ordinary skill in the art to include the dispersion equalizer that is disclosed by Bergano in the system of Prior Art and Otani. One of ordinary skill in the

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art would have been motivated to do this since the dispersion equalizer device of Bergano offers advantage for compensating wavelength dispersion of each optical channel in the variable span distance.

11. Claims 4, 5, 12 and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. Morakawa et al. U.S. patent no. 6,404,523. Wavelength division multiplexing system and its termination
- b. Mizrahi U.S. patent no. 6,373,609. Wavelength tailored dispersion compensation apparatus
- c. Delavaux et al. US patent no. 5,608,562. Optical communication system with adjustable dispersion compensation
- d. Cvijetic et al. US patent no. 5,917,635. Optical repeaters for single and multi-wavelength operation with dispersion equalization


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13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dzung Tran whose telephone number is (703) 305-0932.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor, Jason Chan, can be reached on (703) 305-4729.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.


LESLIE PASCAL
PRIMARY EXAMINER